Proceedings of the Iowa Academy of Science

Volume 6 | Annual Issue Article 30

1898

Permian Rocks of Eastern Russia

Charles R. Keyes

PERMIAN ROCKS OF EASTERN RUSSIA.

BY CHARLES R. KEYES.

(Abstract.)

In this country the Permian question has long troubled our geologists. For more than forty years it has been discussed, and up to the present time little advancement appears to have been made. Recently, interest has been awakened in the subject, and many workers have begun to attack the problems anew.

At first glance the title of this paper would seem to have little bearing upon our Iowa geology. Yet, it is directly to the Iowa part of the question that the present statements are intended to apply. The southwestern part of the state contains beds that have been placed in the Permian. In the consideration of the so-called Permian beds in America, few workers have been able to compare these formations directly with the original Permian. The information has been largely second hand, and the literature is to a great extent inaccessible on account of being in foreign languages and widely scattered.

During the geological excursions that preceded and followed the sessions of the International Congress of Geologists that were held in St. Petersburg a year ago, a number of American workers, interested in the Permian question, were able to examine pretty extensively the original beds constituting Murchison's system. The examinations were especially instructive, on account of the personal guidance of the Russian geologists, who had long worked in the region. Along the flanks of the Urals, and in the great valleys of the Kama and Volga rivers, the sections were particularly complete.

The most remarkable feature about the Russian Paleozoic strata above the Devonian is, that in nearly every respect, they are almost identical with the same parts of the general geological sections developed in the Mississippi valley, as found in Iowa, Missouri, and Kansas. And, strangely enough, the very

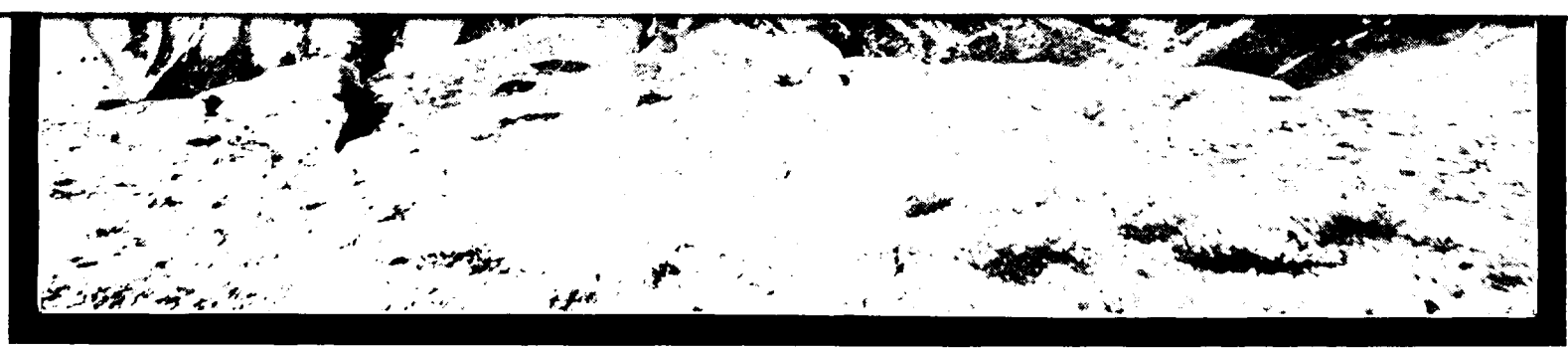
same questions that have so long perplexed investigators in this country, are momentous problems yet not fully solved in Russia. Yet, a comparison between the two widely separated provinces throws some light on our own perplexities.

The basins occupied by the upper Paleozoic in Russia, and the Mississippi valley, are very nearly of the same size. In the first mentioned area the Permian very greatly predominates as the surface rock; in the last named, the coal measures. The Carboniferous of Russia presents two very distinct aspects: a thalassic facies, occurring on the western flanks of the Urals, and made up of limestone chiefly; and a shallow water or littoral phase, that is coal-bearing, which is best developed in the southern and western parts of the great area, principally in the Donetz and Toula basins.

COMPARISON OF GENERAL SECTIONS.

RUSSIA.	CHARACTER OF TERRANES.	MISSISSIPPI VALLEY.
Tartaran, Permo-Trias: or Upper Permian, P_3.	Shales and marls, red and variegated, sandstones, shaly, fossils rare, "red beds."	Cimarron series.
Middle Permian, P_2.	Limestones, some dolomitic, and calcareous marl.	Marion li. } Series.
Lower Permian, P_1b.	Shale, only 200 feet thick in Kama valley.	
Upper Permo-Carboniferous (base of equal P), CP_c.	Limestone, heavy, dolomitic.	Chase li. }
Artinsk, CP.	Shales, sandstones, some thin limestones.	Neosho. Cottonwood. Wabaunsee.
Upper Carboniferous, C_3.	Limestones and shales, highly fossiliferous.	Missourian series.
Moscouan, Middle Carboniferous, C_2.	Shales, sandstones, thin limestones, coal-bearing.	Des Moines series.
Lower Carboniferous, C_1.	Limestones chiefly, some shale and sandstone.	Mississippian.

In the consideration of a theme like the present one it is recognized at the outset that comparisons of terranes of different geological provinces involve no necessary exact synchrony, except through absolute physical means of correlation. Such a standard, independent of intrinsic features of the terranes is not yet formulated for widely separated districts. The shortcomings of the common fossil criteria, in any other than the most general way and in the absence of something better, are well known. Any agreement of biotic features in stratigraphic successions distantly removed from one another are



Characteristic Cuesta Relief, near Tchoufout Kalè, in the Crimea.

looked upon, so far as indicating their simultaneous origin, only as happy accidents. Instead of furnishing proofs of time equivalency it suggests for similar faunas merely likeness of conditions, irrespective of time. Such faunal facies are only biologically representative. They are merely homotaxial.

In lithological and faunal characters the rocks are so nearly alike that it is difficult to fancy that in the Urals one is on the opposite side of the earth from our Iowa and Kansas beds.

Among the pertinent questions regarding the so-called Permian in this country three are of special prominence. They are: (1) Should the Permian be recognized in America? (2) If so, what is the taxonomic rank? and (3) what are the upper and lower limits of the terrane, so-called? Without going into details of these questions it may be suggested:

First.—That while we have in America a great succession of deposits identical in all essential respects to the original Permian of Russia, the two great basins merely had similar histories that are not necessarily connected, and probably were wholly independent of each other and unrelated; that the Russian Permian constitutes a geological province by itself; and that therefore the term Permian should not be used as a technically exact term in connection with the Mississippi valley deposits.

Second.—That Permian as originally proposed applies to a provincial series, and according to our usual standard, has at best a taxonomic rank below that of system. Also, in view of the possible elevation of its subdivisions to the rank of series the term will have no position in the scheme of classification. It will be, no doubt, eventually dropped altogether, the various series belonging to the succession being made a part of the Carboniferous system. In this country the same plan has already been proposed.

Third.—That, with the solution given to the second question, it is unnecessary to attempt to locate the limits of the so-called Permian in this country. The divisional lines of the series comprising the beds of the typical American section in Kansas are already well defined, with the possible exception of the upper member.

The data upon which these conclusions are based are given at length in another place.